DEPARTMENT OF LABOR & ECONOMIC GROWTH

DIRECTOR'S OFFICE

CONSTRUCTION CODE

Filed with the Secretary of State on December 16, 2004
These rules take effect on February 28, 2005

(By authority conferred on the director of the department of labor & economic growth by section 4 of 1972 PA 230, MCL 125.1504, and Executive Reorganization Order Nos. 1996-2 and 2003-1, MCL 445.2001 and 445.2011)

R 408.31061, R 408.31062, R 408.31063, R 408.31064, R 408.31065, R 408.31066, R 408.31070, of the Michigan Administrative Code are amended, R 408.31059, R 408.31060 and R 408.31069 are added to the Code, and R 408.31071, R 408.31072, R 408.31073, R 408.31074, R 408.31075, R 408.31076, R 408.31077, R 408.31078, R 408.31079, R 408.31080, R 408.31081, R 408.31082, R 408.31083, R 408.31084, R 408.31085, R 408.31086 of the code are rescinded as follows:

PART 10
MICHIGAN UNIFORM ENERGY CODE

R 408.31059 Applicable code.

Rule 1059. Rules governing the energy efficiency for the design and construction of residential buildings shall be those contained in Chapter 11 of the 2003 International Residential Code. With the exceptions noted, Chapter 11 of the 2003 International Residential Code is adopted by reference in these rules. The Michigan uniform energy code is available for inspection or purchase at the Okemos office of the Michigan Department of Labor & Economic Growth, Bureau of Construction Codes and Fire Safety, 2501 Woodlake Circle, Okemos, Michigan 48864, at a cost as of the time of adoption of these rules of $2.50.

R 408.31060 Scope.

Rule 1060. Sections N1101.1, N1101.2, N1101.2.1 and table N1101.2 of the code are amended to read as follows:

N1101.1. Scope. This chapter sets forth the energy efficiency standards for detached 1-and 2-family dwellings and multiple-single family dwellings. One-and 2-family dwellings and multiple-single family dwellings shall be designed and constructed as regulated by the code for energy efficiency.

Exceptions:

1. A detached 1-and 2-family dwelling or portion thereof that has an intended maximum rate of energy usage less than 3.4 Btu/h per square foot of floor space for all purposes.
2. Portions of a detached 1-and 2-family dwelling that is not heated or mechanically cooled.
3. An existing detached 1-and 2-family dwelling, other than replacement fenestration as provided by section N1102.4.
4. An alteration of an existing detached 1-and 2-family dwelling.

5. A detached 1-and 2-family dwelling that is moved into or within a jurisdiction. A home manufactured pursuant to the Michigan premanufactured unit rules that is shipped for initial installation or initial assembly and installation on a building site shall not be considered a moved building.

6. Historical structures listed on the state or national historical register.

N1101.2 Compliance. Compliance with the code shall be demonstrated by meeting the requirements of the applicable sections and tables of the code. Where applicable, provisions are based on the climate zones where the building is located. The climate zone assignments are as set forth in table N1101.2 for the county in which the building is constructed. The permit applicant shall determine the method used to achieve compliance with the provisions of the code at the time of application for permit.

N1101.2.1 Detached 1-and-2 family dwellings. Compliance shall be demonstrated by 1 of the following:

1. Meeting the requirements of the code.
2. Meeting the requirements of the International Energy Conservation Code for detached 1- and 2-family dwellings.
3. Meeting the design, construction and certification requirements under the US EPA Energy Star Homes Program ®.
4. Meeting the design and construction requirements in conformance with the national Home Energy Rating System (HERS) guidelines with a score of 83 or better. A certificate indicating the score prepared by an accredited agency shall be filed with the code official.

Table N1101.2
Climate Zones by County

Zones		
1	2	3
Allegan	Alcona	Alger
Barry	Alpena	Baraga
Berrien	Antrim	Chippewa
Branch	Arenac	Delta
Calhoun	Bay	Dickinson
Cass	Benzie	Gogebic
Clinton	Charlevoix	Houghton
Eaton	Cheboygan	Iron
Genesee	Clare	Keweenaw
Gratiot	Crawford	Luce
Hillsdale	Emmet	Mackinac
Huron	Gladwin	Marquette
Ingham	Grand Traverse	Menominee
Ionia	Iosco	Ontonagon
Jackson	Isabella	Schoolcraft
Kalamazoo	Kalkaska	
Kent	Lake	
Lapeer	Leelanau	
Lenawee	Manistee	

Livingston	Mason	
Macomb	Mecosta	
Monroe	Midland	
Montcalm	Missaukee	
Muskegon	Montmorency	
Oakland	Newaygo	
Ottawa	Oceana	
Saginaw	Ogemaw	
Sanilac	Osceola	
Shiawassee	Oscoda	
St. Clair	Otsego	
St. Joseph	Presque Isle	
Tuscola	Roscommon	
Van Buren	Wexford	
Washtenaw		
Wayne		

R 408.31061 Definitions.

Rule 1061. Section N1101.4 is added to the code to read as follows:

N1101.4 Definitions. Definitions shall have the meanings as defined in the code.

R 408.31062 Fenestration

Rule 1062. Section N1101.3.2 of the code is amended to read as follows:

N1101.3.2. Fenestration. The *U*-factor of fenestration shall be determined in accordance with NFRC 100 by an accredited, independent laboratory, and labeled and certified by the manufacturer. The solar heat gain coefficient (SHGC) of fenestration shall be determined in accordance with NFRC 200 by an accredited, independent laboratory, and labeled and certified by the manufacturer.

Exception: Computer simulations by independent NFRC certified laboratories or approval under section 21 of 1972 PA 230, MCL 125.1521 are considered in compliance with this section.

N1101.3.2.3 R-values of fenestration products. Windows, doors and skylights shall be rated for thermal resistance based on the entire fenestration unit. The R-values of all fenestration products in a building shall be the reciprocal of the U -factor and meet the requirements set forth in table N1102.1. The U-factor may be converted to R values by using the inverse of the U-factor (R value = 1/U-factor).

R 408.31063 Thermal performance criteria.

Rule 1063. Thermal performance criteria. Tables N1102.1, N1102.1.1.1(1), and N1102.1.1.2 of the code are amended to read as follows:

TABLE N1102.1
SIMPLIFIED PRESCRIPTIVE BUILDING ENVELOPE THERMAL COMPONENT CRITERIA MINIMUM REQUIRED THERMAL PERFORMANCE (*U*-FACTOR AND *R*-VALUE)

Exterior Enclosure		Zones 1	2	3
Wall Assemblies		R-21	R-21	R-21
Fenestration/Openings (area weighted average of the total area of fenestration units)[1,]		U =0.35 (R= 2.85)		
Roof/Ceiling Assemblies[2]		R-49	R-49	R-49
Floors over unconditioned spaces		R –21	R-21	R-21
Slab on grade construction[3]		R-11, 4ft	R-13, 4 ft	R-18, 4ft
Crawl space walls[4]		R-20	R-20	R-20
Basement walls	Continuous Insulation	R-10	R-10	R-15
	Cavity Insulation	R-11	R-11	R-19

[1] Fenestration units are required to meet this standard for the entire unit.
[2] Skylight U (1/R) factors are required to meet the fenestration requirements set forth in this table for fenestration/openings. Skylights are limited to 10% of the gross roof/ceiling area.
[3] See section N1102.1.6 for additional installation criteria.
[4] See section N1102.1.7 for additional installation criteria.

TABLE N1102.1.1.1(1)
MASS WALL PRESCRIPTIVE BUILDING ENVELOPE REQUIREMENTS

BUILDING LOCATION		MASS WALL ASSEMBLY *R*-VALUE a (hr·ft^2·°F) / Btu	
Climate Zone	HDD	Exterior or integral insulation	Other mass walls
1	6,000-6,999	R-15.5	R-18.4
2	7,000-8,499	R-15.5	R-18.4
3	8,500-12,999	R-18.4	R-18.4

For SI: 1 (hr · ft² · ºF)/Btu = 0.176 m^2 · K/W.

TABLE N1102.1.1.2
STEEL-FRAME WALL MINIMUM PERFORMANCE REQUIREMENTS (*R*-VALUE)

CLIMATE ZONES	HDD	EQUIVALENT STEEL-FRAME WALL CAVITY AND SHEATHING *R*-VALUE [a] (hr ft2 °F) / Btu
1	6,000-6,999	R-13+R-10, R-19+R-9, R-25+R-8
2	7,000-8,499	R-13+R-10, R-19+R-9, R-25+R-8
3	8,500-12,999	R-13+R-10, R-19+R-9, R-25+R-8

For SI: 1 (hr · ft² · ºF)/Btu = 0.176 m^2 · K/W.
a. The cavity insulation *R*-value requirement is listed first, followed by the sheathing *R*-value requirement.

R 408.30164 Replacement fenestration.

Rule 1064. Section N1102.4 of the code is amended to read as follows:

N1102.4. Replacement fenestration. Where some or all of an existing fenestration unit is replaced with an entirely new replacement fenestration product, including frame, sash and glazed portion, in an existing building, the replacement fenestration shall have a U-factor that does not exceed the maximum fenestration U-factor and an SHGC that does not exceed the maximum fenestration SHGC in table N1102.5. Replacement skylights and roof windows shall be permitted to have a maximum U-factor of 0.60. The replacement fenestration products shall also satisfy the air leakage requirements of section N1101.3.2.2.

R 408.31065 Prescriptive path for additions and window replacements.

Rule 1065. Section N1102.5 and table N1102.5 are added to the code to read as follows:

N1102.5 Prescriptive path for additions and window replacements. As an alternative to demonstrating compliance with section N1105 or N1102, additions with a conditioned floor area less than 500 square feet (46.5m2) to existing single-family residential buildings and structures shall meet the prescriptive envelope component criteria in table 1102.5 for the designated heating degree days (HDD) applicable to the location. The *U*-factor of each individual fenestration product (windows, doors and skylights) shall be used to calculate an area-weighted average fenestration product *U*-factor for the addition, which shall not exceed the applicable listed values in table N1102.5. For additions, other than sunroom additions, the total area of fenestration products shall not exceed 40 percent of the gross wall and roof area of the addition. The *R*-values for opaque thermal envelope components shall be equal to or greater than the applicable listed values in table N1102.5. Replacement fenestration products (where some or all of an existing fenestration unit is replaced with an entire new replacement unit, including the frame, sash and glazing) shall meet the prescriptive fenestration *U*-factor criteria in table N1102.5 for the designated HDD applicable to the location.

Conditioned sunroom additions shall maintain thermal isolation; shall not be used as kitchens or sleeping rooms; and shall be served by a separate heating or cooling system, or be thermostatically controlled as a separate zone of the existing system.

Exception: Replacement skylights shall have a maximum *U*-factor of 0.60 when installed in any location above 1,999 HDD.

TABLE N1102.5
PRESCRIPTIVE ENVELOPE COMPONENT CRITERIA
ADDITIONS TO AND REPLACEMENT WINDOWS FOR EXISTING
DETACHED 1- AND 2-FAMILY DWELLINGS

HEATING DEGREE DAYS	MAXIMUM	MINIMUM					
	Fenestration U-factor[e]	Ceiling R-value[a,e]	Wall R-value[e]	Floor R-value	Basement wall R-value[b]	Slab perimeter R-value and depth[c]	Crawl space wall R-value[d]
6,000 - 8,499	0.35	R-49	R-21	R-21	R-11	R-13, 4 ft.	R-20
8,500 - 12,999	0.35	R-49	R-21	R-21	R-19	R-18, 4 ft.	R-20

For SI: 1 foot = 304.8 mm.
a. "Ceiling *R*-value" shall be required for flat or inclined (cathedral) ceilings. Floors over outside air shall meet "Ceiling *R*-value" requirements.
b. Basement wall insulation shall be installed in accordance with section 502.2.1.6.
c. Slab perimeter insulation shall be installed in accordance with section 502.2.1.4. An additional R-2 shall be added to "Slab perimeter *R*-value" in the table if the slab is heated.
d. "Crawl space wall *R*-value" shall apply to unventilated crawl spaces only. Crawl space insulation shall be installed in accordance with section 502.2.1.5.
e. Sunroom additions shall be required to have a maximum fenestration *U*-factor of 0.50 in locations with 2,000 - 12,999 HDD. In locations with 0-5,999 HDD, the minimum ceiling *R*-value shall be R-19 and the minimum wall *R*-value shall be R-13. In locations with 6,000 - 12,999 HDD, the minimum ceiling *R*-value shall be R-24 and the minimum wall *R*-value shall be R-13.

R 408.31066 Building design

Rule 1066. Sections N1105.1, N1105.1.1, N 1105.1.2 and N1105.1.3 are added to the code to read as follows:

N1105.1 Building design. Residential design by systems analysis. A building designed in accordance with this section is considered in compliance with the code if the calculated heating energy consumption is not more than that of a standard design building envelope designed in accordance with the code. The use of this compliance method is at the election of the permit applicant. For a proposed alternate building design to be considered similar to the standard design, the proposed alternate building design shall be the same as the standard design for all of the following:

1. Floor area.
2. Thermal envelope area.
3. Exterior design conditions.
4. Occupancy.
5. Climate data.
6. Usage operational schedule.

N1105.1.1 Standard building design criteria. The standard building design criteria shall include the following:

1. Gas and oil-fired heating source efficiency rating of 78% AFUE.
2. An air changes per hour (ACH) rate of 0.55 for the purpose of calculation only.
3. For reduced ACH levels, documentation of a post-construction blower-door test shall be provided to the code official.
4. A simplified heating degree day (HDD) approach for the appropriate zone, as follows:

a. Zone 1 6900 HDD.
b. Zone 2 7800 HDD.
c. Zone 3 9300 HDD.

Exception: The typical meteorological year (TMY), or its ersatz equivalent, from the national oceanic and atmospheric administration (NOAA) or an approved equivalent, for the closest available location, may be used for the proposed alternative design.

N1105.1.2 Analysis method. The analysis methodology or calculation tool used for comparison of the heating energy usage of the standard and the proposed alternative building design shall be the same.

N1105.1.3 Analysis Report. A heating energy analysis comparison shall be submitted to the code official including all of the following information:

a. The design criteria used to develop the standard design and the proposed alternative design.
b. A detailed technical comparison of the 2 building and system designs.

c. The data used in, and resulting from, the comparative analysis to verify that both the analysis and the design meet the criteria of this section and sections N1105.1 to N1105.2.

R 408.31069 Renewable energy source analysis.

Rule 1069. Section N1106.1 is added to the code to read as follows:

N1106.1 Renewable energy source analysis. A building designed to use a renewable energy source for all or part of its energy source shall be designed and constructed in compliance with the requirements of this section.

Exception: The renewable energy may be excluded from the total heating energy consumption allowed for the building.

a. The renewable energy shall be derived from a specific collection, storage, or distribution system.

b. The heating energy derived from renewable sources and the reduction in conventional heating energy requirements shall be separately identified from the overall building energy use.

c. Supporting documentation on the basis of the performance estimates for the renewable energy sources shall be submitted to the code official.

R 408.31070 Heating energy analysis comparison report.

Rule 1070. Sections N1107.1, N1107.1.1, N1107.2, abbreviated report form N1107.1, and table N1107.1 are added to the code to read as follows:

N1107.1 Heating energy analysis comparison report. A heating energy comparison report shall be submitted to the code official to include both of the following information:

1. A basic description of the proposed alternate building design and any exceptions to the standard design criteria.

2. Abbreviated report form N1107.1, comparing the alternative house design with a standard design house complying with the provisions of this chapter through the systems analysis method.

Abbreviated Report Form N1107.1
Heating Energy Analysis Comparison Report

Builder's Name:

Project Address:

City/Township/County:

PROPOSED ALTERNATIVE HOUSE		STANDARD DESIGN HOUSE	
ROOF/CEILING (INC. SKYLIGHTS)	SUBTOTALS	ROOF/CEILING (INC. SKYLIGHTS)	SUBTOTALS
A_1 _____ /R_1 _____ = A_1 /R_1 _____ A_2 _____ /R_2 _____ = A_2 /R_2 _____ A_3 _____ /R_3 _____ = A_3 /R_3 _____ _____ A_1 /R_1 + A_2 /R_2 + A_3 /R = Total Roof/Ceiling Area	_____ Line 1	_____ x 0.0204 = Total Roof/Ceiling Area (all zones)	_____ Line A
GROSS WALL		GROSS WALL	
Opaque Wall (Does not include band joist, windows, doors, etc.) A_1 _____ /R_1 _____ = A_1 /R_1 _____ A_2 _____ /R_2 _____ = A_2 /R_2 _____ A_1 /R_1 + A_2 /R_2 =	_____ Line 2		
Band Joist A _____ /R _____ = A /R _____ =	_____ Line 3		
Fenestration and Doors, Windows A_1 _____ /R_1 _____ = A_1 /R_1 _____ A_2 _____ /R_2 _____ = A_2 /R_2 _____ A_3 _____ /R_3 _____ = A_3 /R_3 _____ A_1 /R_1 + A_2 /R_2 + A_3 /R_3 =	_____ Line 4		
Doors A_1 _____ /R_1 _____ = A_1 /R_1 _____ A_2 _____ /R_2 _____ = A_2 /R_2 _____ A_1 /R_1 + A_2 /R_2 =	_____ Line 5		
Other A _____ /R _____ = A/R _____ = _____ Total Gross Wall Area	_____ Line 6		
GROSS WALL SUBTOTAL A/R (Lines: 2+3+4+5+6)	_____ Line 7	_____ x 0.093 = Total Gross Wall Area (all zones)	_____ Line B

Abbreviated Report Form N1107.1
Heating Energy Analysis Comparison Report
Continued

FOUNDATION/FLOOR	SUBTOTALS	FOUNDATION/FLOOR	SUBTOTALS
Floors Over Unconditioned Spaces A _____ /R _____ = A/R _____ =	_____ Line 8	Floors Over Unconditioned Spaces _____ x 0.0476 = Total Floor Area (all zones)	_____ Line C
Slab on Grade Floors (Area = Perimeter x 2') A _____ /R _____ = A/R _____ =	_____ Line 9	Slab on Grade (Unheated) _____ x $Z_1$0.0909 $Z_2$0.0769 = $Z_3$0.050 Total Slab Edge Area Slab on Grade (Heated) _____ x $Z_1$0.0769 $Z_2$0.0667 = $Z_3$0.050 Total Slab Edge Area	_____ Line D _____ Line E
Crawl Space Walls (Area: Top foundation wall to average finished grade) A _____ /R _____ = A/R _____ =	_____ Line 10	Crawl Space _____ x 0.050 = Total Crawl Space Wall Area (all zones)	_____ Line F
Basement Walls (Area: Top foundation wall to average finished grade) A_1 _____ /R_1 _____ = A_1 /R_1 _____ A_2 _____ /R_2 _____ = A_2 /R_2 _____ A_1 /R_1 + A_2 /R_2 = Basement Windows A _____ /R _____ = A/R _____ = _____ Total Gross Basement Wall Area	_____ Line 11 _____ Line 12	Basement Walls _____ x $Z_1$0.090 $Z_2$0.090 = $Z_3$0.055 Total Gross Basement Wall Area	_____ Line G
FOUNDATION/FLOOR SUBTOTAL A/R (Lines: 8+9+10+11+12)	_____ Line 13	FOUNDATION/FLOOR SUBTOTAL A/R (Lines: C+D+E+F+G)	_____ Line H
PROPOSED ALTERNATIVE HOUSE SUB-TOTAL A/R (Lines: 1+7+13)	_____ Line 14	STANDARD DESIGN HOUSE SUB-TOTAL A/R (Lines: A+B+H)	_____ Line I
HEATING EQUIPMENT EFFICIENCY (If the same as Standard House, go to line 16 or 17) (Oil or Gas Fired) AFUE: _____% Line 14: _____ = Adjusted A/R = AFUE: 0.___	_____ Line 15	HEATING EQUIPMENT EFFICIENCY (Oil or Gas Fired) AFUE: 78% Line I:_____ = Adjusted A/R = AFUE: 0.78	_____ Line J
AIR LEAKAGE RATE (If the same as Standard House, go to line 17)		AIR LEAKAGE RATE	

_____ ACH x _____ ft^3 x 0.018 = Air Changes per Hour Volume of House	_____ Line 16
PROPOSED ALTERNATIVE HOUSE TOTAL (Lines: 15+16) Equal to or less than line L to pass	_____ Line 17

0.55 ACH x _____ ft^3 x 0.018 = Volume of House	_____ Line K
STANDARD DESIGN LIMIT TOTAL (Lines: J+K)	_____ Line L

N1107.1.1 Alternative design constants. The alternative design constants of table N1107.1 may be used for the specific site weather data (heating degree days) for the proposed alternative design.

Table N1107.1
Alternative Standard Design Constants (1/r) for Systems Analysis Approach

Heating Degree Days	6000 – 6499	6500 – 6999	7000 – 7499	7500 – 7999	8000 – 8499	8500 – 8999	9000 +
Roof/Ceiling	0.0204	0.0204	0.0204	0.0204	0.0204	0.0204	0.0204
Gross Wall	0.093	0.093	0.093	0.093	0.093	0.093	0.093
Foundation/floor Floor over unconditioned space	0.0476	0.0476	0.0476	0.0476	0.0476	0.0476	0.0476
Slab on grade Unheated slab	0.0909	0.0909	0.0769	0.0769	0.0769	0.050	0.050
Heated Slab	0.0769	0.0769	0.0667	0.0677	0.0667	0.050	0.050
Crawl space	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Basement wall	0.0909	0.0909	0.0909	0.0909	0.0909	0.0555	0.0555

N1107.2 Compliance. The proposed alternative design shall be determined to be in compliance when the proposed alternative house A/R total (line 14 or line 17 of abbreviated report form N1107.1) is less than or equal to the standard design house (line I or line L of abbreviated report form N1107.1).

R 408.31071 Rescinded.

R 408.31072 Rescinded.

R 408.31073 Rescinded.

R 408.31074 Rescinded.

R 408.31075 Rescinded.

R 408.31076 Rescinded.

R 408.31077 Rescinded.

R 408.31078 Rescinded.

R 408.31079 Rescinded.

R 408.31080 Rescinded.

R 408.31081 Rescinded.

R 408.31082 Rescinded.

R 408.31083 Rescinded.

R 408.31084 Rescinded.

R 408.31085 Rescinded..

R 408.31086 Rescinded.